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IDENTIFICATION OF COST AND QUALITY BENEFITS ON IMPLEMENTATION OF ICT BASED PRACTICES IN INDIAN SMES

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ABSTRACT

The Globalized environment offered transformation in trade, business, and infrastructure due to digitalization. In this digitally connected environment, Small and medium scale enterprises (SMEs) cannot overlook factors such as competitive state, economic movement, and technology innovation in global as well as local context. Indian SMEs are promoting economical growth in country. So Indian SMEs need to understand and adopt digitally connected globalized competitive environment. Indian SMEs can become truly global, regardless of location or primary market base, by adopting advancement in Information and communication Technologies (ICT) for business management to sustain in global competition. This paper identifies the significant difference in performance measures of Indian SMEs with well defined ICT system and Indian SMEs without well defined ICT system. This has been achieved by testing the hypotheses using t-Test over data collected from SMEs in Navi Mumbai region. Finally results imply that Cost and Quality benefits are assured in ICT based Indian SMEs.

KEYWORDS: Information System in SMEs in India, Indian SMEs Performance Benefits, Cost and Quality Benefits for Indian SMEs with IS

INTRODUCTION

The SME sector is an important pillar of developing countries, creating employment opportunities and contributing to GDP. Industrial survey of India presented in the year 2012 revealed the vital role of SMEs for the growth of Indian economy by contributing 45 % of industrial output, 40 % of export and also in term creating 1.3 million jobs every year. The growth in SMEs also shown contribution towards GDP is 17 % at present and expected further to reach up to 22 % by 2020 [1]. According to the report, "The Indian SME Survey Analysing Indian SME Perceptions Around Union Budget 2014-15", the challenges of Indian SMEs are absence of easy finance and credit instruments, Limiting regulatory polices, Unavailability of modern, affordable technology, Lack of basic infrastructure facilities, Absence of exclusive marketing platforms and distribution networks, Inflexible labour laws and availability of affordable skilled labour [2]. For exponential growth, Indian SMEs can overcome these challenges by using a powerful, refined, industry-specific ITC (Information communication Technology) solution with relatively small budgets [3]. ICT is playing a big role in providing affordable access to technology everywhere specially in rural areas in India. From SMEs perspective ICT enhances the communication among business, partners and customers; enhance the operational efficiencies by reducing cost and making deliveries faster; enhance the information Quality of decision making, global reach growth perspective, resource management and automation. ICT promotes and effects innovation, productivity of firms. SMEs in manufacturing can

benefit from more advanced ICT tools such as Enterprise Resource Planning (ERP) system, Customer relation management (CRM|) system, Business intelligence (BI) system or inventory management. ICT tools have become a big enabler for the large businesses organizations. In Indian SMEs are ICT adoption percentage is low due to poor telecommunications infrastructure in rural area, limited ICT literacy, inability to integrate ICT into business processes, government regulations, low economic power, and a poor understanding of the opportunities of the digitally connected global economy [3]. SMEs in different sectors use ICT differently and will adopt them at a different space. There is a need to find the performance benefits of SMEs on implementation of ICT based practices to their core business.

LITERATURE REVIEW

To get insight of Indian SMEs and ICT, different reports, articles, and research papers are studied in Indian context as well as other countries. Virginia Barba et al. [2007], concluded that ICT can reduce business costs, improve productivity and strengthen growth possibilities. The adoption and implementation of ICT by firms can improve business cooperation, business relationships, quality and diffusion of knowledge. Further author presented the need to find the business performance as well as competitive advantages with ICT. This provided motivation for current study[6]. Das k. [2008], concluded that Indian SMEs are looking forward to a newer and larger market space, with its numerous advantages of skills, raw materials and large domestic market as well, networking with various stakeholders both within and outside the country. This study helped the current study to understand the advantages of globalization with technology for SMEs in India [7]. M. H. Bala Subrahmanya et al. [2010], concluded that Innovative SMEs, experienced higher growth. Most of the innovative SMEs recognized the innovations to a combination of firm level technological capability and market pressure. For firm level technological capability internal factors considered as self-motivation, technical qualification, knowledge, experience, and innovative ideas of entrepreneurs, and for market pressure external factors considered as customer requirements and demand, information provided by suppliers of equipments and materials, market opportunities, and competition. Thus, both 'technology push' and 'demand pull' have contributed to the emergence of innovations. This helped to understand the role of technology push for innovations which lead to growth of SMEs in India [9]. Michelle [2011] discussed reasons for low adoptions of IT in the Chinese SMEs are financing constraints and the lack of skilled IT talent. This study helped to understand the constraint of IT adoption in Chinese firms [4]. According to the Report of India's Brand equity foundation (IBEF) [2013], Government is trying to push it forward with a number of plans to foster technology, innovation and quality in SMEs. Banks have joined hands with private players to improve the credit disbursal to SMEs. This help to understand the technology push by government for the SMEs [8]. Sheik Abdullah [2014] discussed that the implementation of ICT can cause a number of issues for Indian SMEs, such as insufficient financial sources, lack of experience with ICT and insufficient knowledge and skills in the area of computer literacy of employees. This has helped to understand the issues in implementation of ICT in SMEs [10]. According to the report "The Indian SME Survey Analysing Indian SME Perceptions Around Union Budget 2014-15", there are many challenges of SMEs viz. finance and credit instruments; regulatory polices; modern, affordable technology; basic infrastructure facilities; exclusive marketing platforms and distribution networks; labour laws and availability of affordable skilled labour. It also shed the light on Expectations from modern technology viz. Ensuring modern technology is cheaper and subsidized; Platform for technology providers and technology seekers; Revitalizing the role of the Small Industries Service Institute; More Government incentives for technology up-gradation; Develop strong Information and Communication (ICT) systems; Common platform to exhibit technology solutions; ICT networks to cater to SME; Fairs and summits for network building; and Common marketing body for access to marketing networks. The above literature discussed the benefits, challenges,

issues and expectations of ICT in Indian SMEs. Reports show that penetrations of technologies in Indian SMEs are low as compare to large industries and other countries SMEs [2]. SMEs are not aware about the benefits and opportunities provided by ICT so there is a need of further investigation of performance of SMEs with well defined ICT system.

OBJECTIVES

- To identify the COST and QUALITY benefits of Indian SMEs with well defined ITC system.
- To identify the significant difference in COST and QUALITY benefits of Indian SMEs with well defined ITC system and Indian SMEs without well defined ITC system

To achieve above objectives first cost and quality benefits are identified from literature and discussion with some of stakeholders. Then conceptual model is designed and hypotheses are proposed. Data is collected from two sets, SMES with well defined ICT and SMEs without well defined ICT. t-Test is carried out to test the hypothesis and results are discussed.

IDENTIFICATION OF COST AND QUALITY BENEFITS OF INDIAN SMES WITH WELL DEFINED ICT SYSTEM

For this study Cost and Quality is considered as performance measures of Indian SMEs. Cost reduction is considered as cost benefits and Quality improvements are considered as quality benefits on implementation of ICT in SMEs. Form SMEs business point of view, for this study overall COST Benefits are considered in terms of reduction in Inventory costs, Procurement costs, Technical costs, Maintenance costs, Transportation/logistic costs, Monitoring costs, Internal coordination costs, Communication costs, Documentation costs, Direct operating costs, Cost to retain old customers or to acquire new customer, cost of manpower to keep with the growth/expansion of business. Quality achievement is important factor is for SMEs to remain competitive in this globalized world. From SMEs competitive perspective, for this study overall Quality Benefits with ICT based system is considered as improvements in Quality of process, Quality of service , Quality of System , Quality of Information flow, Quality of on time delivery , Quality of services the customers or to attract new customer , Quality of decision making (anticipating unexpected change in external market) , Quality of business relationship with partners and vendors. To find the significant difference in the performance of SMEs with well defined ICT and SMEs without well defined ICT system, the conceptual model is developed as shown in figure 1

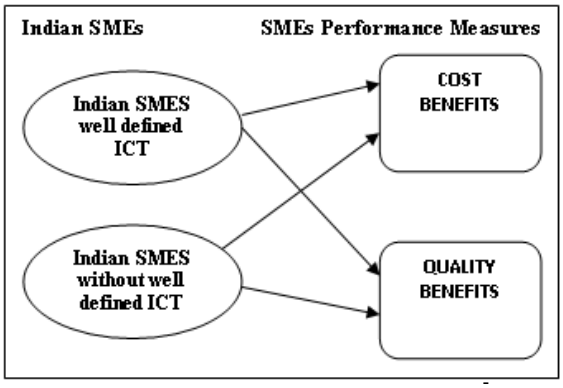

Figure 1: Conceptual Model to Identify Cost and Quality Benefits of SMES with ICT

FORMULATION OF HYPOTHESES IN CONTEXT WITH RESEARCH OBJECTIVES

For this study, it is predicated that there is a significant difference in performance measures (COST and QUALITY) of SMEs with well defined ICT and SMES without well defined ICT. This hypothesis is an assumption or a statement that may or may not be true. Null and alternate hypothesis are proposed for COST and QUALITY benefits for this study. Null hypothesis (Ho) proposed for a COST benefit is that, there is no significant difference in COST reduction in SMEs with well defined ICT and SMEs without well defined ICT. Alternate hypothesis (Ha) for COST benefits is that there is a significant difference in COST reduction in SMEs with well defined ICT and SMEs without well defined ICT. Null hypothesis (Ho) proposed for QUALITY benefits is that here is no significant difference in QUALITY improvements in SMEs with well defined ICT and SMEs without well defined ICT. Alternate hypothesis (Ha) for QUALITY benefits is that there is a significant difference in QUALITY improvements in SMEs with well defined ICT and SMEs without well defined ICT. Here cost and quality benefits are measured with sub-cost variables and sub-quality variables. So sub- null hypotheses and sub-alternate hypotheses are proposed for COST and QUALITY as shown in table 1 and table 2 respectively

Table 1: COST Factors with Null Hypotheses and Alternate Hypotheses

Factors for Cost	Null Hypothesis	Alternate Hypothesis
H1-Inventory cost	H1o-There is no significant difference in Inventory cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H1a-There is no significant difference in Inventory cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H2- Procurement cost	H2o-There is no significant difference in Procurement cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H2a-There is significant difference in Procurement cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H3- Technical cost	H3o-There is no significant difference in Technical cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H3a-There is significant difference in Technical cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H4- Maintenance cost	H4o-There is no significant difference in Maintenance cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H4a-There is significant difference in Maintenance cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H5- Transportation / logistic cost	H5o-There is no significant difference in Transportation / logistic cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H5a-There is significant difference in Transportation / logistic cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H6- Monitoring cost	H6o-There is no significant difference in Monitoring cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H6a-There is significant difference in Monitoring cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H7-Internal coordination cost	H7o-There is no significant difference in Internal coordination cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H7a-There is significant difference in Internal coordination cost reduction in SMEs with well defined ICT and SMEs without well defined ICT

Table 1: Contd.,		
H8-Communication cost	H8o-There is no significant difference in Communication cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H8a-There is significant difference in Communication cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H9-Documentation cost	H9o-There is no significant difference in Documentation cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H9a-There is significant difference in Documentation cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H10-Direct operating cost	H10o-There is no significant difference in Direct operating cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H10a-There is significant difference in Direct operating cost reduction in SMEs with well defined ICT and SMEs without well defined ICT
H11- Customers retention	H11o-There is no significant difference in Customers retention reduction in SMEs with well defined ICT and SMEs without well defined ICT	H11a-There is significant difference in Customers retention reduction in SMEs with well defined ICT and SMEs without well defined ICT
H12-Manpower cost to keep with the growth	H12o-There is no significant difference in Manpower cost reduction in SMEs with well defined ICT and SMEs without well defined ICT	H12a-There is significant difference in Manpower cost reduction in SMEs with well defined ICT and SMEs without well defined ICT

Table 2: QUALITY Factors with Null Hypotheses and Alternate Hypotheses

Factors for Quality	Null Hypothesis	Alternate Hypothesis
H1-Quality of process	H1o-There is no significant difference in Quality of process improvements in SMEs with well defined ICT and SMEs without well defined ICT	H1a-There is no significant difference in Quality of process improvements in SMEs with well defined ICT and SMEs without well defined ICT
H2-Quality of Service	H2o-There is no significant difference in Quality of Service improvements in SMEs with well defined ICT and SMEs without well defined ICT	H2a-There is significant difference in Quality of Service improvements in SMEs with well defined ICT and SMEs without well defined ICT
H3-Quality of Information flow	H3o-There is no significant difference in Quality of Information flow improvements in SMEs with well defined ICT and SMEs without well defined ICT	H3a-There is significant difference in Quality of Information flow improvements in SMEs with well defined ICT and SMEs without well defined ICT
H4-Quality of on Time Delivery	H4o-There is no significant difference in Quality of Information flow improvements in SMEs with well defined ICT and SMEs without well defined ICT	H4a-There is significant difference in Quality of Information flow improvements in SMEs with well defined ICT and SMEs without well defined ICT
H5-Quality of Decision Making	H5o-There is no significant difference in Quality of Decision Making improvements in SMEs with well defined ICT and SMEs without well defined ICT	H5a-There is significant difference in Quality of Decision Making improvements in SMEs with well defined ICT and SMEs without well defined ICT
H6- Quality of Business Relationship	H6o-There is no significant difference in Quality of Business Relationship improvements in SMEs with well defined ICT and SMEs without well defined ICT	H6a-There is significant difference in Quality of Business Relationship improvements in SMEs with well defined ICT and SMEs without well defined ICT

DATA COLLECTION AND ANALYSIS

For data collection, questionnaire is designed on the basis of objective of research and 7 point scale is used. These questionnaires were personally handover to executives of SMEs along with interview to get the faster and accurate responses. Here data is collected from two independent groups, like SMEs with well defined information systems and SMEs without well defined information systems. Out of 50 samples, 25 samples were from SMEs with well defined information systems and 25 samples were from SMEs without such well defined information systems. Own judgment criteria, personal interview and actual visit to SMEs were used to identify the level of information system adopted by SMEs for categorization. Since sample size is small and samples are independent, independent sample t-test procedure is adopted to verify hypotheses. Data collected of each group is processed under t-test using Microsoft excel platform. The value of t statistics obtained as the outcome of the test performed is compared with the standard value at a level of significance α. This comparison is made with an aim to arrive at a decision regarding the acceptance or rejection of hypothesis. In this comparison the level of significance is 5% then p value shall be less than 0.05 ($p < 0.05$). This benchmark is considered for decision to reject the null hypothesis and to accept the alternate hypothesis. Table 3 and Table 4 show the t-test statistics and hypothesis testing results for COST benefits and QUALITY respectively.

Table 3: COST Hypotheses Testing Result using T-Test

Hypotheses	Mean	Variance	P-Value	Result of Hypothesis Testing
H1-Inventory cost	5.28	0.793333	7.73E-10	H1o Rejected,H1a Accepted
H2- Procurement cost	5.2	0.916667	2.03E-06	H2o Rejected ,H2a Accepted
H3- Technical cost	4.75	0.978261	0.002771	H3o Rejected ,H3a Accepted
H4- Maintenance cost	5.36	1.156667	3.44E-05	H4o Rejected ,H4a Accepted
H5- Transportation / logistic cost	5.12	0.86	7.56945E-07	H5o Rejected, H5a Accepted
H6- Monitoring cost	5.2	1.166666667	4.39801E-09	H6o Rejected , H6a Accepted
H7-Internal coordination cost	5.24	1.023333	4.54E-06	H7o Rejected, H7a Accepted
H8-Communication cost	5.6	1.25	4.49E-12	H8o Rejected, H8a Accepted
H9-Documentation cost	5.2	0.75	1.36E-13	H9o Rejected, H9a Accepted
H10-Direct operating cost	5.52	0.926667	1.75E-13	H10o Rejected, H10a Accepted
H11- Customers retention	5.52	1.176667	2.4E-10	H11o Rejected, H11a Accepted
H12-Manpower to keep with the growth	4.72	0.71	0.000116	H12o Rejected, H12a Accepted

Table 4: COST Hypotheses Testing Result using T-Test

Hypotheses	Mean	Variance	P-Value	Result of Hypothesis Testing
H1o Rejected, H1a Accepted	5.08	0.66	4.68E-09	
H2o Rejected, H2a Accepted	5.04	0.79	8.3E-06	
H3o Rejected, H3a Accepted	4.96	1.04	0.001466	
H4o Rejected, H4a Accepted	4.88	0.61	5.0918E-06	
H5o Rejected, H5a Accepted	4.72	0.71	0.000116	
H6o Rejected, H6a Accepted	4.72	0.71	0.000116	

RESULTS AND CONCLUSIONS

The results of hypothesis testing reveal that each null hypothesis is rejected and every alternate hypothesis is accepted for performance measures of Indian SMEs. This suggests that cost and quality benefits are assured in Indian SMEs with well defined ICT based practices. The hypotheses testing indicate that the Indian SMEs with well defined ICT system are getting higher COST and QUALITY benefits than the SMEs without well defined ICT system. This will provide further inspiration for the implementation of ICT in Indian SMEs as many owners of SMEs were suspicious about

advantages of ICT. However, the readiness of Indian SMEs for advanced ICT based practices is depending on performance benefits into their core business in terms of cost and quality with basic ICT tools. At inter-firm level, ICT have great potential to reduce costs and to improve quality. Advanced ICT applications like KMS (Knowledge Management System), ERP (Enterprise Resource Planning), and customer relation management (CRM) provides massive opportunities for the firms to use the acquired knowledge in digitally connected competitive global economy. In this digital transformation era, the recent advancement and innovations in areas of Social, Mobile, Analytics, open source technology and Cloud can drive technology adoption in SMEs as these technologies are easier, simpler and cheaper. In this context, this study can provide further motivation for research to develop the framework for advanced ICT systems implementation in Indian SMEs.

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